Fisheries and Aquaculture

Fishery and Aquaculture Country Profiles
Vanuatu

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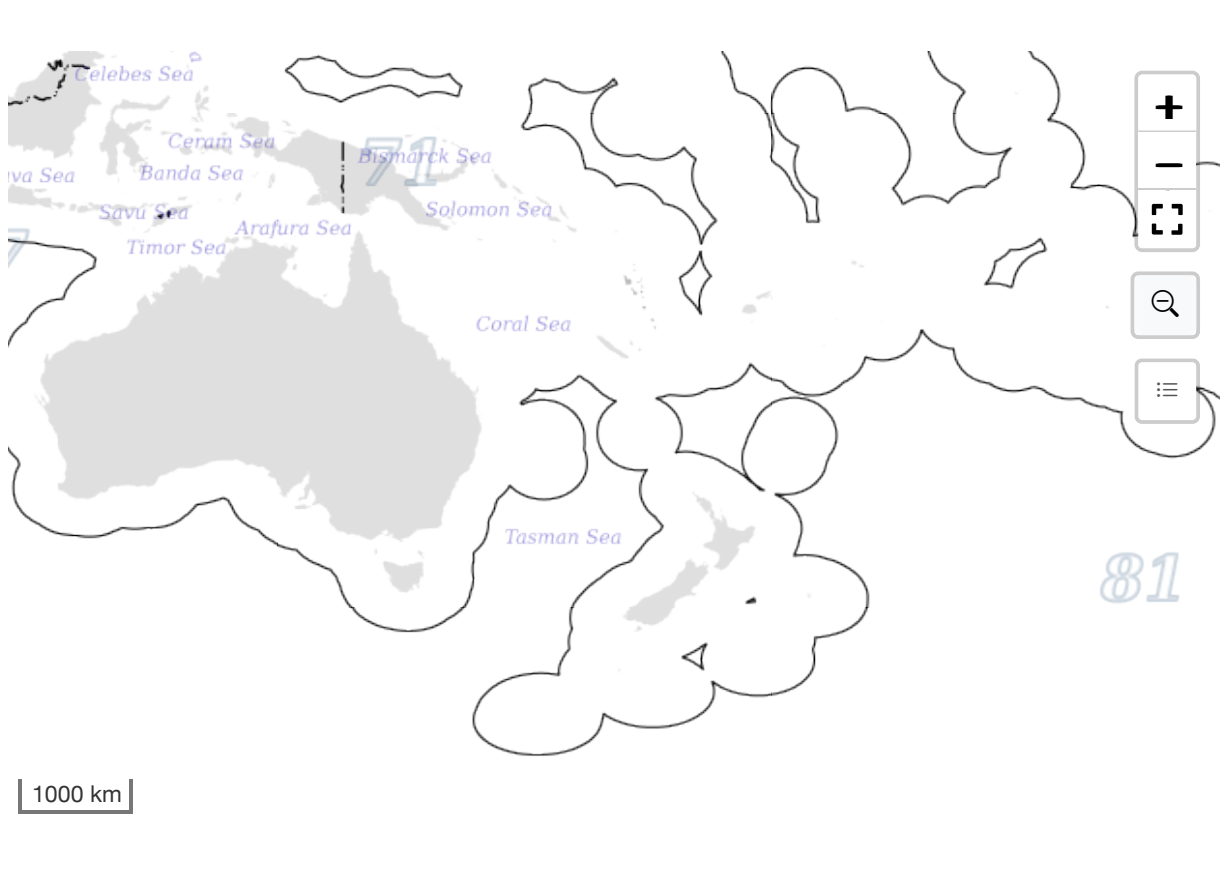


Geographical layers

Map legend

Part I Overview and main indicators

Part I of the Fishery and Aquaculture Country Profile is compiled using the most up-to-date information available from the FAO Country briefs and Statistics programmes at the time of publication. The Country Brief and the FAO Fisheries Statistics provided in Part I may, however, have been prepared at different times, which would explain any inconsistencies.

Country brief

Prepared: June, 2018.

Vanuatu has a population of 270 400 in 2016, a land area of 12 190 km^2, a coastline of 1 920 km, and an Exclusive Economic Zone (EEZ) of 680 000 km^2. Fisheries contribution to the GDP in 2012 was estimated as USD 5.5 million, 0.7 percent of the national GDP. The fisheries export value in 2015 was estimated at USD 100 million and import value at USD 5.1 million. Annual per capita consumption was 32.1 kg in 2013.

Compared to other Pacific island countries, inshore marine areas are not extensive in Vanuatu. Inner reef areas are limited to narrow fringing reefs and the area covered by mangroves is quite small. A total of 161 vessels were reported in 2016 with just over half under 12 m LOA.

Vanuatu has industrial scale distant water fisheries operating in the Atlantic Ocean, the Indian Ocean and the eastern Pacific Ocean in addition to its own EEZ and surrounding area with at least 96 longliners, 3 purse seiners and 2 trawlers active fishing vessels in 2015. However, total catch in distant waters has significantly reduced after the peak of almost 144 000 tonnes reached in 2006 and it was about 77 tonnes in 2016, in addition to 43 000 tonnes taken in the western central Pacific fishing area where Vanuatu is located. Coastal fishing is primarily carried out for subsistence purposes and for sales for local markets. Subsistence fishing activities include coastal line and net fishing targeting demersal and small pelagic reef and lagoon fish, as well as reef gleaning and collection of shellfish and other invertebrates.

In 2016, the aquaculture sector employed 34 women and 173 men. An estimated 38% of the people engaged in marine fishing and subsistence fisheries were women. In addition, there are some coastal fisheries that are export oriented, including trochus, bêche-de-mer, and aquarium fish. The aquarium fishery has been in existence in Vanuatu for the last 15 years. In 2015, Vanuatu exported ornamental fish valued at USD 224 000 and corals and shells valued at USD 92 000.

Aquaculture efforts in Vanuatu have included attempts at raising oyster, rabbitfish, freshwater shrimp, trochus, green snail and tilapia in the past. In mid-1999 some spawning trials of giant clams were carried out, and some experimental culture of *Eucheuma* seaweed was also undertaken. Vanuatu aquaculture produced 16 tonnes of fish and shrimp in 2016, a drastic drop from 2014 due to devastation caused by cyclone Pam in 2015. Vanuatu leaders had shown interest in introducing more intensive fish farming techniques from Asian countries.

Vanuatu is a signatory to the UN Convention on the Law of the Sea, the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and central Pacific Ocean and the Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Vanuatu is also a party to the following treaties and agreements relating to the management of regional fisheries.

General geographic and economic indicators

Table 1 - General Geographic and Economic Data - Vanuatu

		Source
Shelf area:	8 681km^2	Sea Around US: http://www.seaaroundus.org/
Length of continental coastline:	2 528 km	World by Map
Fisheries GDP (2014):	0.63% National GDP	Gillet, 2016[1]

(1) Gillett, R. D. Fisheries in the Economies of Pacific Island Countries and Territories. Pacific Community (SPC), 2016.

*Value converted by FAO as per UN currency exchange rate

FAO Fisheries statistics

Table 2 in this section is based on statistics prepared by the FAO Fishery Information, Data and Statistics Unit and disseminated in 2018. The charts are based on the same source but these are automatically updated every year with the most recent statistics.

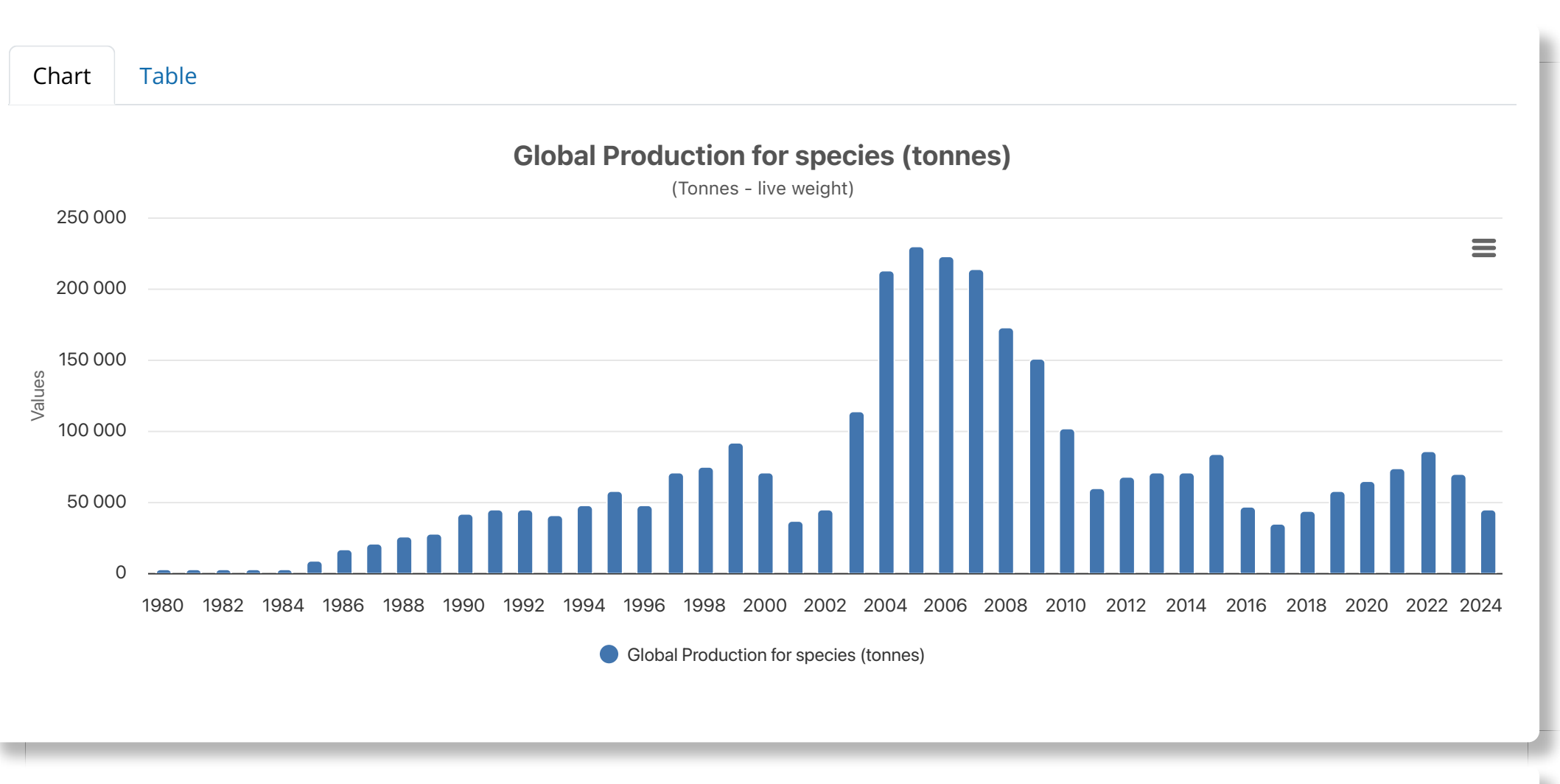
Table 2 — FAO fisheries statistics – Vanuatu

	1980	1990	2000	2010	2014	2015	2016
EMPLOYMENT (thousands)	0.045	0.3	...	...	3.039	250.7	243.707
Aquaculture	...	...	...	...	0.139	0.2	0.207
Capture	0.045	0.3	...	...	2.9	250.5	243.5
Inland	...	...	...	...	...	...	...
Marine	*0.045*	*0.3*	...	...	*2.9*	*250.5*	*243.5*
FLEET(thousands vessels)	...	...	...	0.17	0.119	0.211	0.161

Source: FAO Fishery and Aquaculture Statistics
1) Due to roundings total may not sum up
Please Note:

Fishery statistical data here presented exclude the production for marine mammals, crocodiles, corals, sponges, pearls, mother-of-pearl and aquatic plants.

Chart Table



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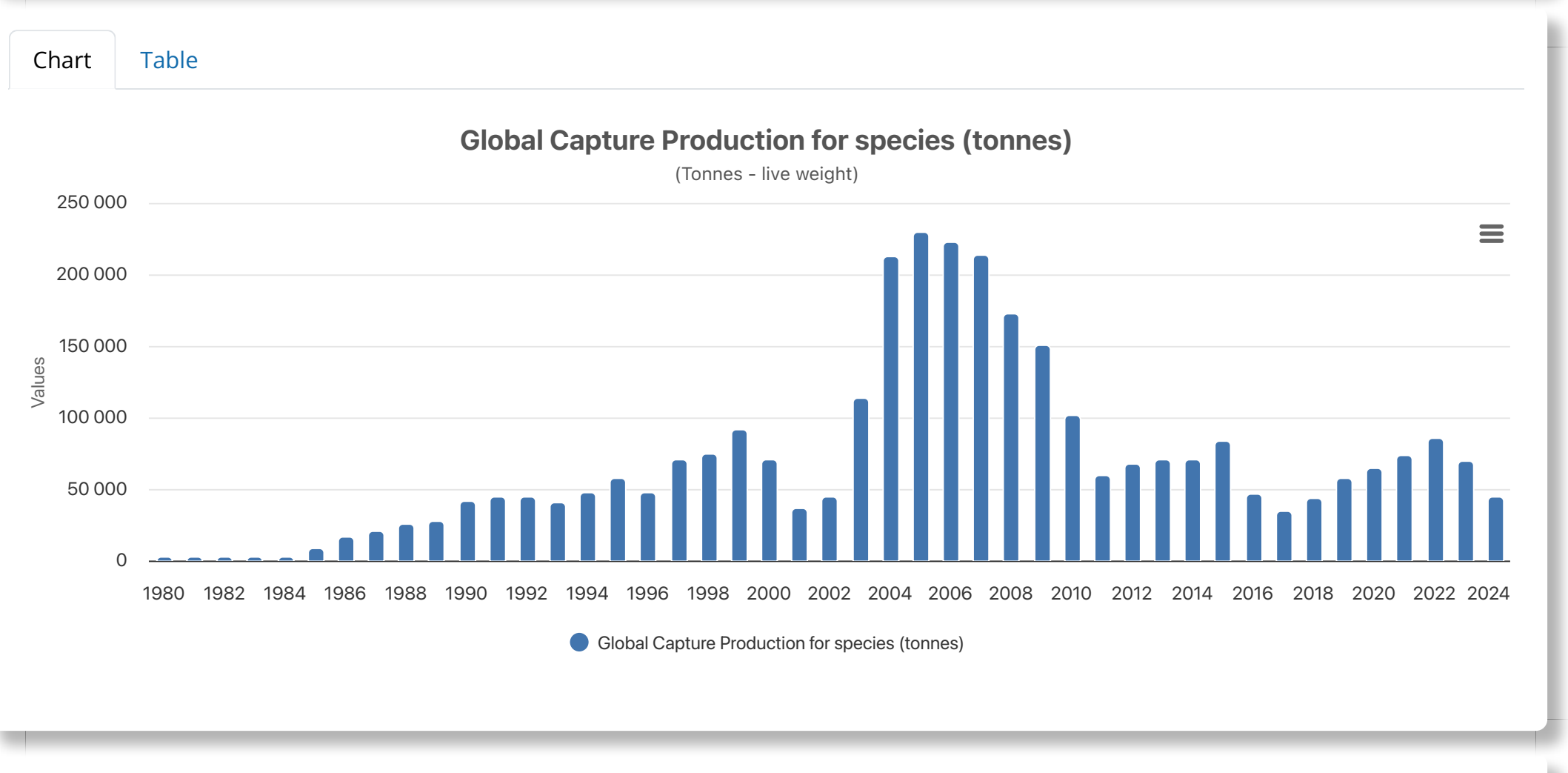

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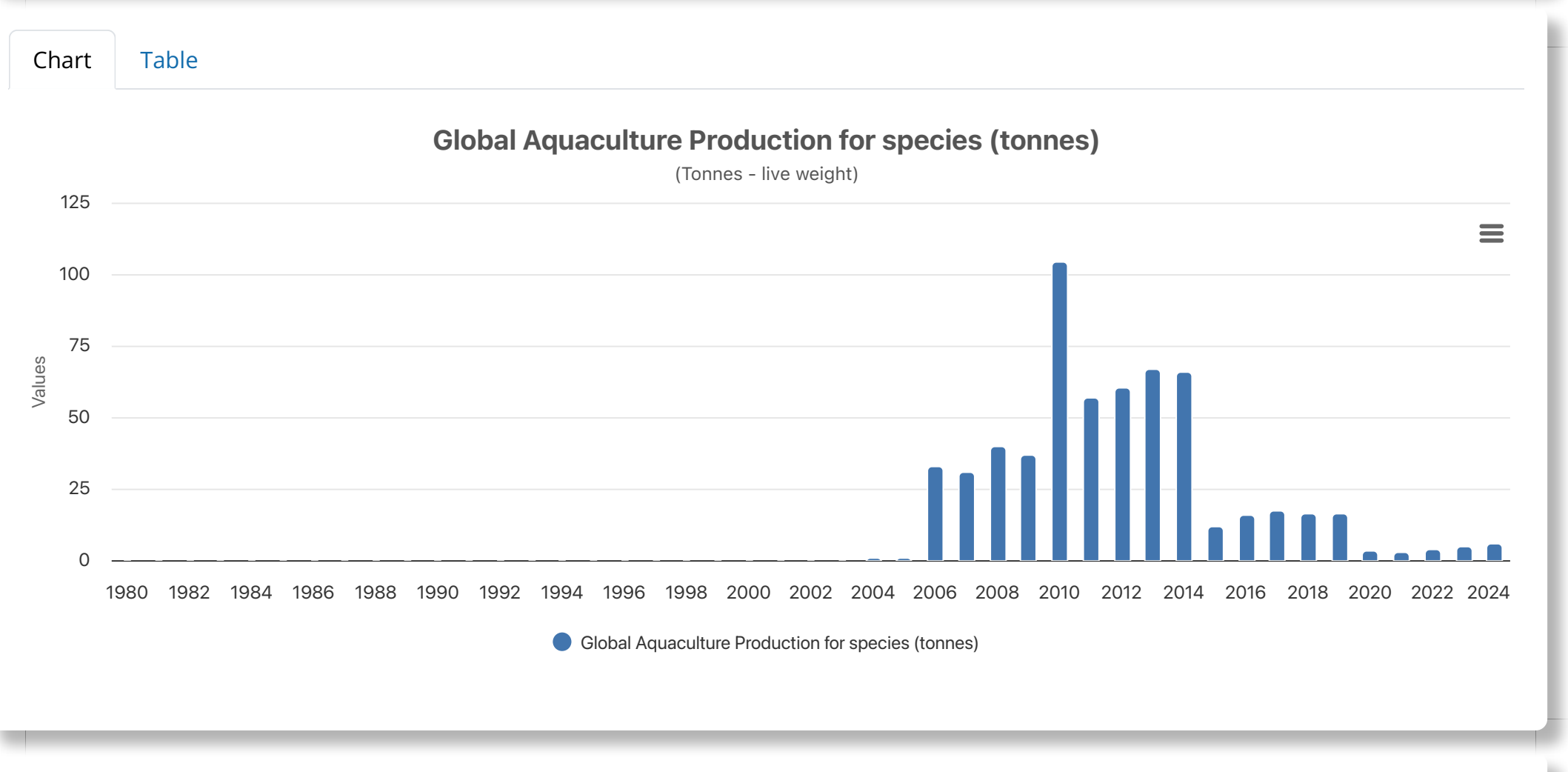

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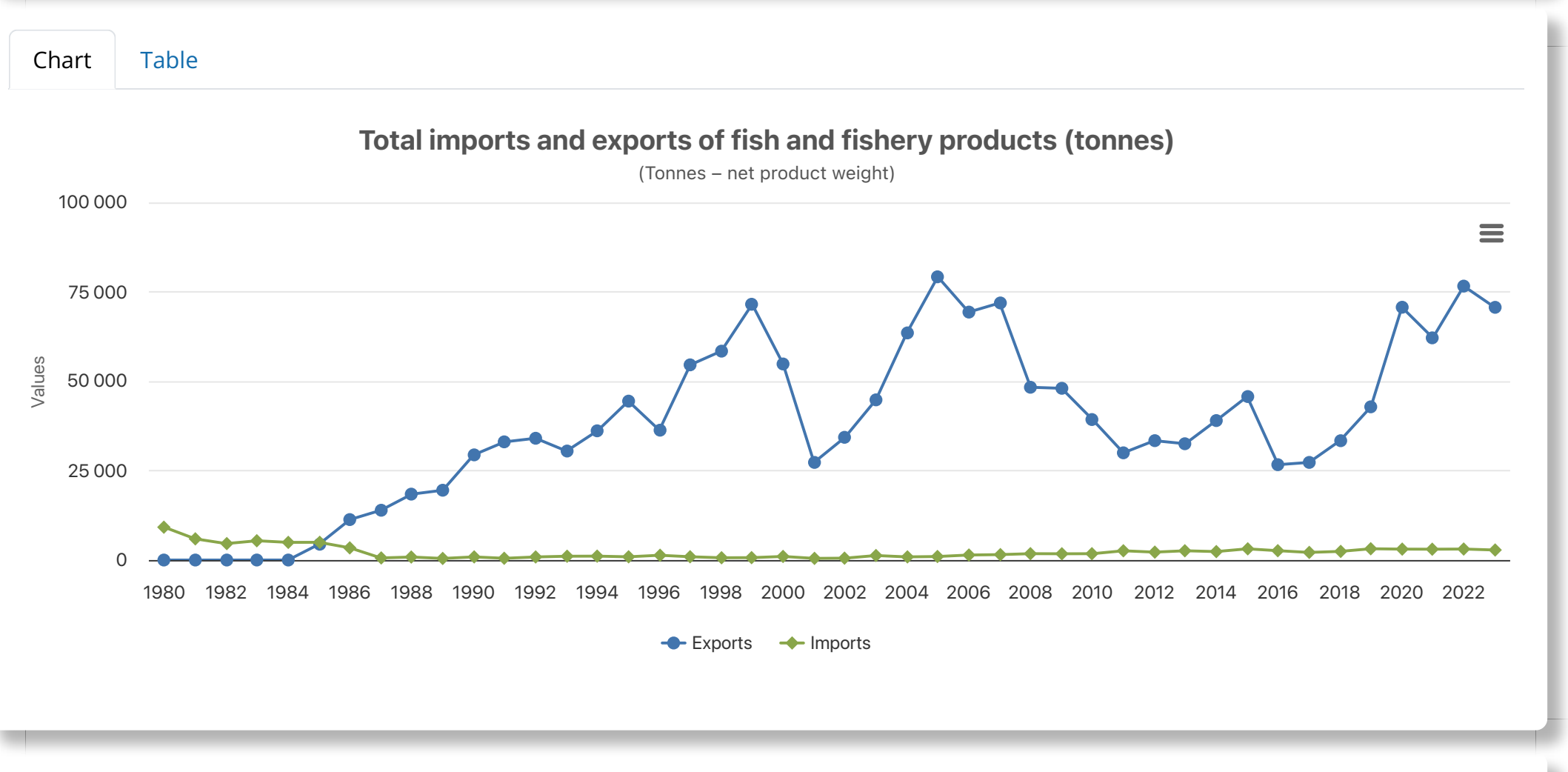

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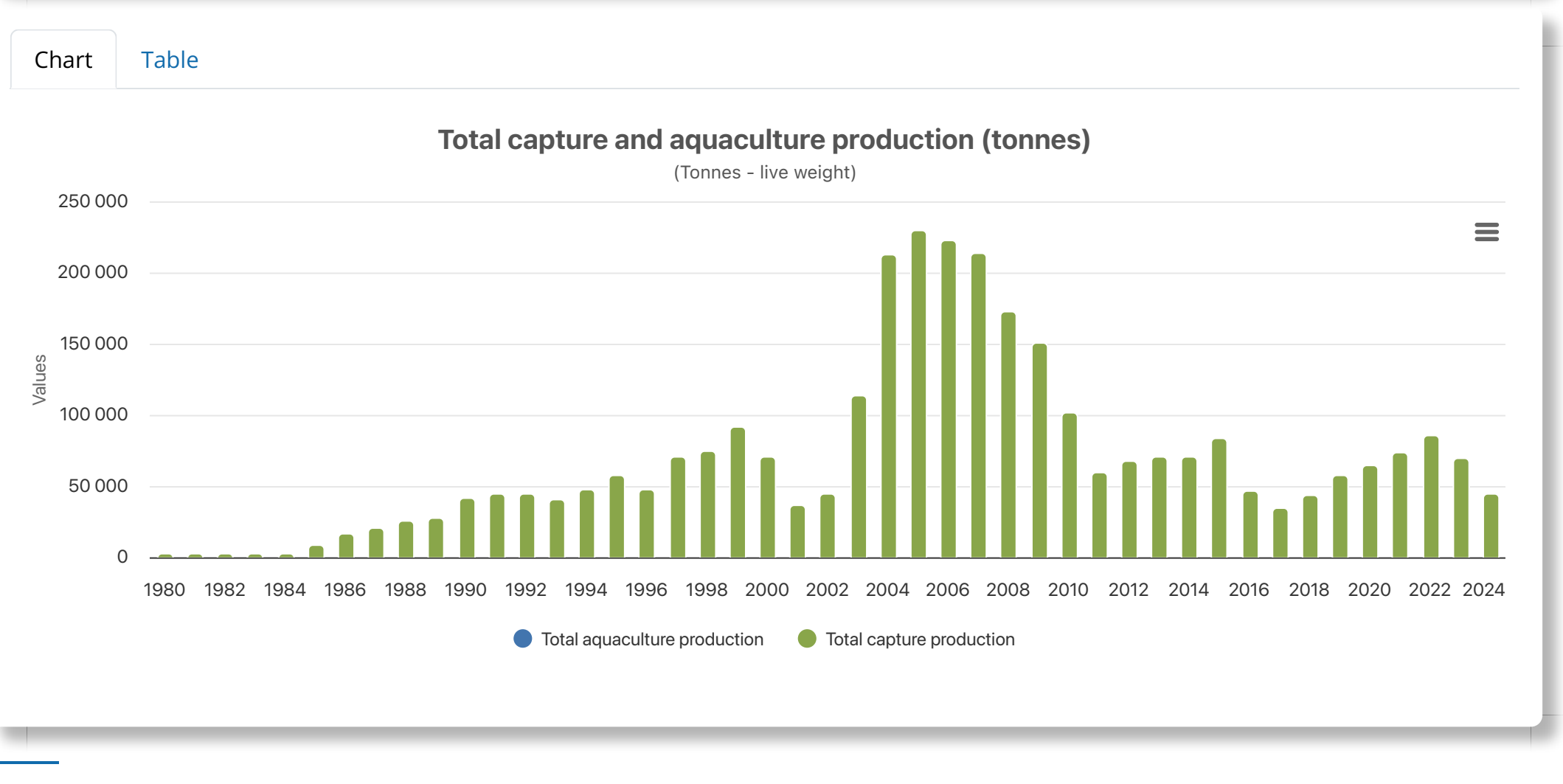


Part II Narrative Updated 2017

Part II of the Fishery and Aquaculture Country Profile provides supplementary information that is based on national and other sources and that is valid at the time of compilation (see update year above). References to these sources are provided as far as possible.

Production sector

Vanuatu is a Y-shaped archipelago of about 80 islands, 67 of which are inhabited and 12 of which are considered major. The islands plus associated reefs lie between latitudes 13–21°S and longitudes 166–172°E in the western Pacific Ocean. The archipelago measures approximately 850 km in length. Nearly 80 percent of the population resides in rural areas.

Tourism is the fastest-growing sector and the country's main foreign exchange earner following an increase in visitor arrivals. The agriculture sector remains the traditional economic base of the country, with potential to grow. The fisheries sector was once important in the country's economy through the South Pacific Fishing Company's industrial operations on Espiritu Santo Island, but today the sector is a minor player. Subsistence fisheries, however, remain extremely important in the local economy for household income and food security.

Compared to other Pacific Island countries, inshore marine areas are not extensive in Vanuatu. Inner reef areas are limited to narrow fringing reefs and the area covered by mangroves is quite small. The areas of inner reefs and lagoons have been estimated to be approximately 448 km^2 and mangroves 25 km^2 (Amos, 2007).

Tropical cyclones are common in Vanuatu and have a large effect on fisheries in the country. In March 2016, Severe Tropical Cyclone Pam, one of the worst natural disasters in the history of the country, destroyed much of Vanuatu's fisheries infrastructure.

Fisheries statistics can be presented in different forms to cater for different purposes. In the Vanuatu statistics published by FAO (Part 1 of this profile), the presentation follows the international conventions and standards used by FAO and its Member States for reporting catches, which are given by the flag of the catching vessel. Accordingly, the fishery and aquaculture production of Vanuatu in 2014, as published by FAO (Part 1) was 67 966 tonnes.

In Table 3 below, the Vanuatu fishery production statistics include the catch by Vanuatu-flagged vessels, the catch by small boats and skiffs operated by nationals from Vanuatu and the catch from fishing activities that do not involve a vessel (e.g. reef gleaning). The offshore category in the table is defined as the catch from Vanuatu-flagged, industrial-scale fishing operations that are carried out anywhere in the western and central Pacific Ocean (i.e. inside or outside Vanuatu waters[2]).

Table 3: Vanuatu fisheries production (as per FAO reporting standards)

2014	Aquaculture	Freshwater	Coastal commercial	Coastal subsistence	Vanuatu- flagged offshore
Volume (tonnes)	43 tonnes and 27 300 pieces[3]	80	1 106	2 800	33 308
Value (USD)	383 377	232 875	5 584 821	7 429 519	n/a

The amounts of production given in the above table differ from those shown in Part 1. The table consists of production estimated from a variety of sources (see SPC study below), whereas the quantities given in Part 1 are generally those reported to FAO by the Vanuatu Ministry of Marine Resources. The major difference between the table and Part 1 is in the category "Vanuatu-flagged offshore". The amount listed in Table 3 for this category is from the official report of Vanuatu to the Western and Central Pacific Fisheries Commission (Fisheries Department, 2015) and consists of the catch of Vanuatu-flagged, industrial-scale fishing operations that are carried out anywhere in the western and central Pacific Ocean, whereas the catches in Part 1 are from Vanuatu-flagged vessels globally.

A recent study by the Pacific Community (SPC) presents the fishery statistics of Vanuatu in a different way. The SPC study reports the amount of catch in the Vanuatu EEZ, regardless of vessel flag. In the study the catches are placed in different categories, which is useful for other purposes, such as administration of the foreign fishing that occurs in the waters of Vanuatu. A summary of fisheries production from the SPC study is given in Table 4.

Table 4: Fisheries production in Vanuatu waters

2014	Aquaculture	Freshwater	Coastal commercial	Coastal subsistence	Offshore locally based[4]	Offshore foreign-based[5]
					Both Vanuatu- and foreign-flagged vessels	
Volume (tonnes)	43 tonnes and 27 300 pieces[6]	80	1 106	2 800	568	10 942
Value (USD)	383 377	232 875	5 584 821	7 429 519	1 474 009	26 402 602

Source: Gillett (2016)

Some comment is required to explain the difference between the information in this table and that in Part 1 of this profile:

- Catches can be given by the flag of the catching vessel (as in the FAO statistics given in Part 1), or by the zone where the catch is made (the "offshore foreign-based" and "offshore locally based" columns in the table above). These two different ways of allocating catch each have their purposes. Attribution by flag is important for consistency with international conventions, while attribution by zone is important for determining fishing contributions to GDP and managing revenue from licence fees for foreign fishing in a country's zone.
- As stated above, the large amount reported for marine capture fisheries in Part 1 includes the catches of Vanuatu-flagged vessels outside the western and central Pacific Ocean, whereas in Table 4 the catches are only those in Vanuatu waters[7].
- There is no fisheries statistical system covering the categories of freshwater fishing, aquaculture and coastal fishing. The estimates above were made by a study carried out by SPC in 2015, which examined a large number of fishery and economic studies covering the last two decades.
- Aquaculture production in Vanuatu includes non-food items, such as coral for the aquarium trade.

(2) The Fisheries Act 2014 defines "Vanuatu waters" as the waters of the exclusive economic zone, the territorial sea, the archipelagic waters, and the internal waters.

(3) The production of several important aquaculture products (e.g. pearls, giant clams) is measured in pieces rather than in weight.

(4) In the SPC study, "offshore locally based" is the catch in Vanuatu waters from industrial-scale tuna fishing operations that are (a) based at a port in Vanuatu, and (b) generally harvested more than 12 nautical miles offshore.

(5) "Offshore foreign-based" is the catch in the Vanuatu zone from industrial-scale tuna fishing operations that are based at ports outside Vanuatu. Under the international standardized System of National Accounts (SNA, 2009), those catches do not contribute to the GDP of Vanuatu.

(6) As noted above, production of several important aquaculture products is measured in pieces rather than in weight.

(7) The Vanuatu International Shipping Registry includes a large number of fishing vessels. The 2011 Annual Report of the Ministry of Agriculture, Quarantine and Livestock, Forestry and Fisheries (MAQLFF, 2011) indicates that 79 Vanuatu-flagged longliners were authorised to fish in the eastern Pacific and in the Atlantic. According to the Fisheries Department (2015), there are a total of 140 vessels on the register.

Marine sub-sector

Catch profile

The marine capture fisheries have two very distinct components, offshore and coastal:

- Offshore fisheries are undertaken on an industrial scale by locally based longline and purse-seine vessels as well as by foreign-based longline vessels.
- Coastal fishing is primarily carried out for subsistence purposes and for sale on local markets. In addition, some coastal fisheries are export oriented, including trochus, beche-de-mer and aquarium fish.

Commercial tuna fishing began in Vanuatu in 1957 with the establishment of the Japanese South Pacific Fishing Company Limited's longline transshipment base at Palekula, Espiritu Santo Island (see section 4.2.2 below on landing sites).

In the offshore fisheries, there is a large distinction between the fishing activity of (a) the fishing vessels that are based in Vanuatu and fish in Vanuatu waters, and (b) the foreign-based vessels fishing in Vanuatu waters, and (c) the fishing vessels on the Vanuatu International Shipping Registry.

- In 2013, three longliners were based in Port Vila and fished in nearby waters, but they departed in early 2014 (W. Obed, Fisheries Department, personal communication). Gillett (2016) indicates that catches of tuna by "domestic vessels and Vanuatu-based foreign vessels" in Vanuatu waters in 2014 were 568 tonnes.
- In 2014, the foreign-based offshore catch in Vanuatu waters was 10 942 tonnes (Gillett, 2016). Most of this fishing was by vessels flagged in China and Taiwan, with some Fiji-flagged vessels (Fisheries Department, 2015).
- Of the 140 fishing vessels on the Vanuatu International Shipping Registry in 2014, 85 vessels (3 purse seiners and 82 longliners) fished in the central and western Pacific (Fisheries Department, 2015). Those Vanuatu-flagged vessels were not based in Vanuatu and most of the fishing by the longliners was outside Vanuatu waters. All of the purse seining was outside Vanuatu waters.

The Fisheries Department (2015; 2016) give information on recent trends in tuna catches by Vanuatu-flagged longliners and purse seiners in the western and central Pacific:

- The Vanuatu longline fleet catch is dominated by albacore then bigeye and lastly yellowfin. The longline fleet recorded the highest catch for albacore in 2010; at 12 293 tonnes this was an increase from 5 582 tonnes in 2008 and 7 992 tonnes in 2009. The highest catch for bigeye was in 2015, which, at 5 603 tonnes, was an increase from 3 419 tonnes in 2014. Yellowfin catches showed an increase between 2009 (514 tonnes) and 2012 (2 230 tonnes), but were lower in 2013 (1 626.2 tonnes) and again showed a slight decrease in 2014 to 1 626 tonnes. Effort for the longline fishery was reduced in the 2013–2014 period but increased in 2014.
- The purse-seine fleet recorded a slight increase in total catch from 2013 (20 099 tonnes) to 2014 (20 514 tonnes) and then a fall in 2015 (8 344 tonnes). The effort (i.e. total number of sets) also increased, with most of the increase being sets associated with floating objects. During this period, the main tuna species in the catch, skipjack, increased by an additional 2 803 tonnes between 2013 and 2014. The percentage and absolute amounts of yellowfin and bigeye decreased in the same period.

Table 5: Catches by Vanuatu-flagged offshore vessels (tonnes)

Year	Total longline catch	Total purse-seine catch	Total longline and purse-seine catch
2011	3 521	23 382	26 903
2012	13 382	24 853	38 235
2013	15 239	20 099	35 338
2014	12 794	20 514	33 308
2015	21 244	8 344[8]	29 588

Source: Fisheries Department (2016)

The coastal fisheries in Vanuatu, although dwarfed in size by offshore fishing are extremely important. The Vanuatu 2010 Household Income and Expenditure Survey (HIES) found that more than 75 percent of the adult population practise at least one form of coastal fishing, whether subsistence or commercial. The survey showed that 2 percent of urban households and 12 percent of rural households had income from the sale of fishery products.

For the coastal fisheries of Vanuatu, the estimates of catches vary widely. Studies to estimate production were carried out by external researchers in 1996, 2000 and 2001, but the estimates were very different. Gillett (2009) used those studies plus (a) the results of the 2006 HIES, (b) export data, (c) estimates of production from recent specialized studies, (d) the results of the recent 2006/2007 agriculture census, and (e) opinions of fisheries specialists. The results indicated a coastal commercial production of 538 tonnes (worth USD 2.2 million) and a coastal subsistence production of 2 830 tonnes (worth USD 5.7 million). An SPC study in 2015 (Gillett, 2016) considered the catch estimates above, a HIES in 2010, a valuation of marine ecosystem services in 2014 (Pascal *et al.*, 2015), export data and several other sources of information. The study concluded that for the year 2014:

- the volume of the production of subsistence fishing was 2 800 tonnes;
- the volumes of coastal commercial fisheries production were made up of finfish/crustaceans, 1 000 tonnes; trochus, 50 tonnes; beche-de-mer, 1.7 tonnes; aquarium products – small volume but worth USD 534 000; and game fishing, 55 tonnes. The estimated total coastal commercial production in Vanuatu in 2014 was 1 106 tonnes, worth USD 5.6 million to the fishers.

One of the most important coastal fisheries in Vanuatu is that for sea cucumbers. Box 1 gives a summary of the fishery.

Box 1: Sea cucumbers in Vanuatu
Sea cucumber resources are a source of income for coastal communities in Vanuatu. The Ni-Vanuatu people do not consume sea cucumbers, so the fishery is entirely a commercial activity. Since the beginning of the 20th century, the dried form of sea cucumbers was one of the principal exports for the former New Hebrides Condominium Government. A by-product of this early trading period is the Pidgin English language spoken today in Vanuatu – Bislama – which derives from the word beche-de-mer, or sea cucumber, and developed from early communication between fishers and traders. The trade was at low levels from the 1930s to the 1970s for various reasons: World War II affected most trading activities with the outside world; there was over-harvesting of the resource in some traditional production areas; and other commodities in the Pacific, such as copra, gained in importance. The revival of the trade began in the 1980s, facilitated by the removal of trade barriers to China. Sea cucumber fisheries boomed in this period across the Asia-Pacific region, but the Vanuatu peak export production of 66 tonnes in the early 1990s was followed by a steady decline until, by mid-2000, the fishery was no longer profitable. In Vanuatu, a total ban on the fishery and export for five years was enforced in January 2008.
Source: Pakoa *et al*. (2013a)

The lack of a fisheries statistical system for coastal fisheries prevents the identification of quantitative trends in these fisheries. There is, however, a general perception that the important coastal resources are increasingly overexploited close to urban areas. The trends in the fisheries that produce non-perishable products are different. Carleton (2012) indicates that there is evidence of a peak in the harvest of sea cucumbers in the early 1990s. In that period, trochus production averaged about 125 tonnes per year (Gillett, 1995) but now is about 50 tonnes per year.

The largest fisheries development efforts in Vanuatu were two projects carried out between 1983 and 1996: the Village Fisheries Development Project (VFDP) and the Fisheries Training and Extension Services Project, funded by the European Union, Japan, Canada and New Zealand. The aims of the projects were to initiate fisheries development by subsidizing the cost of boats, fishing gear and fuel to village communities; setting up rural fishing centres in the islands; and providing training on various aspects of fisheries, including fishing techniques, fish processing, boat maintenance, ice-machine maintenance, fish marketing and business management. A fisheries training centre was established in Santo. The training centre is now the Vanuatu Maritime College and a boat-building yard that is run by the Fisheries Department. When the project funding ended, fishing ventures could not be sustained as they were heavily dependent on the subsidies provided by the projects. The fishing centres in the outer islands could not be sustained either, due to lack of national government funds. The country seemed unready for such large-scale projects, and the technologies introduced seemed too complex or not appropriate for communities with largely subsistence lifestyles at the time (Friedman *et al.*, 2008).

(8) 2015 data provided is "unraised and provisional", according to the Fisheries Department (2016) report.

Landing sites

With the departure of the locally-based longliners in early 2014, all of the offshore catch in Vanuatu waters and all of the catch by Vanuatu-flagged offshore vessels (longliners and purse seiners) is landed outside Vanuatu. Some of the longline catch in Vanuatu waters is landed in other Pacific Island countries (especially Fiji and the Solomon Islands) and some is landed in Asian ports. Most of the catch by Vanuatu-flagged purse-seine vessels is transshipped at a port in neighbouring countries to eventually land in Bangkok, Thailand, or Pago Pago, American Samoa.

No discussion of fish landing sites in Vanuatu would be complete without some mention of the history of the large facility at Palekula (Box 2).

Box 2: Palekula Base
Vanuatu's involvement in tuna fishing commenced in 1957 with the establishment of the South Pacific Fishing Company Limited (SPFC) base at Palekula, Espiritu Santo Island in the north of Vanuatu. SPFC was established by the Japanese Mitsui & Company with the objective of conducting tuna transshipment operations. The facilities established at the Palekula base were large and occupied some 24 hectares of relatively flat land, which had been initially developed by the US Navy during World War II.

The SPFC complex consisted of a main wharf, slipways (one 500 tonnes and one 50 tonnes), original cold storage, two bait freezers (5 000 cartons of bait in 10 kg boxes/room), two quick-freeze rooms, unloading area, engine room, large brine block-ice makers with a crusher and loading facility, housing and workshops.

In 1974, much of the plant was upgraded, with a new cold storage facility replacing the old. The new cold storage was in three rooms, each holding from 500 to 600 tonnes of frozen fish. A new 'T' section was added out from the existing main wharf so that larger carrier vessels could come alongside to load. In addition, a new fuelling wharf was put in at this time, which was also used for vessels to tie up to, as well as two large fuel storage tanks and a pump house with pumping equipment.

Over the years, many longliners from different countries worked out of the Palekula Base. At its height of activity between 1971 and 1973, it was estimated that as many as 100 different longliners could visit the base in one year. The average unloading from 1971 to 1973 was around 14 000 tonnes. In the early 1980s, the number of vessels working to the Palekula Base dropped greatly, with around 4 000 tonnes of fish unloaded in 1981. Unfortunately, the transshipment side of the base's operation closed in 1986, when the remaining vessels relocated to American Samoa to take advantage of incentives offered by processors there. At that time, the facility was turned over to the Government of the Republic of Vanuatu. The slipways were still operational and the government continued using them until 1998, when a problem with the books of SPFC caused their closure. There have been numerous attempts to revive the facility (including a major FAO project), but they have been unsuccessful.

Source: Modified from Chapman (2002)

The coastal commercial food fish catch (i.e. deep-water demersal fish) is mainly offloaded in Port Vila. The non-food catch (i.e. trochus shells) is mostly non-perishable and is often landed close to the fishing areas, which are scattered around the country.

Subsistence fishery landings occur at coastal villages throughout the country, roughly in proportion to the distribution of the population.

Fishing practices/systems

The offshore fishing in Vanuatu waters is currently undertaken only by longlining. In 2014, 51 China-flagged longliners and 14 longliners from other countries fished in Vanuatu waters. In 2015, 49 China-flagged longliners and one Fiji-flagged longliner fished in Vanuatu waters (Fisheries Department, 2016).

Hickey (2008) describes coastal subsistence fishing in Vanuatu. Nearshore catches are often made on foot from shore, over fringing reef flats, or along reef drop-offs or lagoons from outrigger canoes. Cast nets and gillnets, freediving gear and spear guns, handlines and traditional methods (reef gleaning, spears, traps, etc.) are also typically used. The low investment needed to enter nearshore fisheries ensures accessibility to all and low financial risk.

Amos (2007) describes coastal commercial fishing in Vanuatu. These are small-scale activities that principally target shallow and deep-water bottom snapper species ("poulet") and pelagics associated with fish aggregation devices (FADs), using trolling and longlining techniques. It also includes the collection of sessile organisms such as trochus, green snails and beche-de-mer.

Main resources

The main species caught in the offshore fishery in Vanuatu waters are given in Table 6. In 2014, virtually all the tuna was caught by longline gear.

Table 6: Tuna species in the offshore fishery in Vanuatu waters (tonnes)

	Albacore	Yellowfin	Bigeye	Skipjack	Total
2014	6 176	1 230	181	109	7 696
2015	3 524	1 025	158	146	4 853

In terms of the status of offshore resources, the major species of tuna in Vanuatu mix freely with those of the neighboring countries in the western and central Pacific. Recent information from the Scientific Committee of the Western and Central Pacific Fisheries Commission (WCPFC, 2016) shows that for:

- **skipjack** –the stock is currently only moderately exploited and fishing mortality levels are sustainable;
- **bigeye** –recent analysis indicates that overfishing is occurring for the bigeye tuna stock and that to reduce fishing mortality to that at maximum sustainable yield, a large reduction in fishing mortality is required;
- **yellowfin** –the current total biomass and spawning biomass are higher than at levels associated with maximum sustainable yields. Therefore, yellowfin tuna is not considered to be in an overfished state;
- **South Pacific albacore** –there is no indication that current levels of catch are causing recruitment overfishing, particularly given the age selectivity of the fisheries. It should be noted that longline catch rates are declining, and catches over the last 10 years have been at historically high levels and are increasing.

With respect to coastal fisheries, Bell and Amos (1993) list the 22 species that are believed to be the most important finfish in Vanuatu: *Naso lituratus* (orangespine unicornfish), *Kyphosus cinerascens* (highfin rudderfish–topsail drummer), *Epinephelus merra* (honeycomb grouper), *Variola louti* (lunartail grouper), *Scarus blochi* (Quoy's parrotfish), *Cheilinus undulatus* (napoleonfish–maori wrasse), *Hemigymnus melaptarus* (blackedge thicklip wrasse), *Plectorhynchus gibbosus* (black sweetlips), *P. orientalis* (oriental sweetlips), *Chaetodon lineatus* (lined butterflyfish), *Lethrinus harak* (blackspot emperor), *L. miniatus* (longnose emperor), *Sargocentron tieroides* (pink squirrelfish), *Lutjanus fulvus* (flametail snapper), *L. gibbus* (humpback snapper), *Mulloidichthys flavolineatus* (yellowstripe goatfish), *Siganus canaliculatus* (seagrass rabbitfish), *S. doliatus* (pencil-streaked rabbitfish), *Acanthurus lineatus* (bluebanded surgeonfish–convict tang), *Sphyraenagenie* (blackfin barracuda), *Valamugil seheli* (bluespot mullet), *Caranx melampygus* (bluefin trevally) and *Gerres oyena* (oyena mojarra).

Invertebrate species are also very important in the inshore commercial and subsistence fisheries. These include trochus, sea cucumbers, rock lobsters, slipper lobster, coconut crab, green snail and various crustaceans.

Vanuatu's deep-water snapper fishery is well documented. There are about 107 species of deep-water fish, best represented by the families Lutjanidae, Serranidae, Epinephelinae and Lethrinidae. Of these, 11 species – comprising three species each of the genera *Etelis*, *Pristipomoides* and *Epinephelus* and a species each of the genera *Aphareus* and *Lutjanus* – are the top targeted species. Total maximum sustainable yield for the resource was estimated to be 300 tonnes annually. However, production to date has remained well below this figure (Friedman *et al.*, 2008).

Trochus is especially important in Vanuatu. It is a source of cash for remote communities, forms the basis of a small manufacturing industry in Port Vila, has been cultured by the Fisheries Department, and is the object of much management effort. Box 3 gives some information on this shell.

Box 3: Trochus
Trochus (*Trochus niloticus*[9]) is commercially one of the most important shellfish in the Pacific Islands. It is valued for the inner nacreous layer of the shell, which, along with that of the pearl oysters, is used for the manufacture of "mother-of-pearl" buttons.

Trochus live on coral reefs from the inter-tidal zone down to a usual maximum of about 15 m. The natural distribution of trochus is from Wallis Island in the central Pacific westward to Sri Lanka and from southern Japan southward to New Caledonia and northern Australia. The species has also been transplanted to many new areas of the Pacific Islands where in some cases it now supports substantial fisheries.

The annual harvest of trochus in the Pacific Islands in recent years was about 2 300 tonnes with an export value of about USD 25 million. Although this is not great in purely financial terms, the impact is substantial. Because little or no equipment is used in the collecting of trochus and because the shells may be stored for long periods prior to shipment to market, trochus is one of the few commercial fisheries feasible for remote communities. In several Pacific Island countries, trochus provides an important source of cash income at the village level, especially since the demise of the copra industry.

The collection of trochus for its protein-rich flesh has been a traditional activity in Vanuatu for a long time. However, since the end of the 19th century, the sale of trochus for its shell has become apparent in Vanuatu. French settlers were reported to have harvested trochus shells in Vanuatu at the beginning of the 20th century. At present, trochus is one of the major inshore resources in Vanuatu that generates income for the rural communities.

Source: Gillett (1995); Bell and Amos (1993)

For aquarium ornamentals, the National Marine Aquarium Trade Management Plan (VDF, 2009) gives the six fish groups most commonly targeted: the angelfish (Pomacanthidae), gobies (Gobiidae), tangs (Acanthuridae), damsels (Pomacentridae), groupers (Serranidae) and wrasses (Labridae). Of the Pomacanthidae, the flame angel (*Centropyge loriculus*) has been the most exported fish species, representing 12.5 percent of Vanuatu's average total annual fish exports. Fish represent the bulk of Vanuatu's marine aquarium exports, contributing about 66 percent of the total annual average export volume, followed by invertebrates (18 percent) and live rock (10 percent).

There are 18 commercial sea cucumber species present on reefs around the country, but stock densities are naturally low. Seven species are the most important commercially: *Holothuria nobilis, H. scabra, H. atra, Actinopyga miliaris, A. echinites, A. mauritiana* and *Thelenota ananas* (Friedman *et al.*, 2008).

Coconut crab is an important subsistence and commercial resource for communities in some areas in the Banks-Torres and Santo-Malo regions. For the Torres Islands, coconut crab is the main cash crop, with production ranging from 500 to 700 crabs a month (Friedman *et al.*, 2008).

In terms of the status of the coastal fishery resources, there has been little new stock assessment information in the last 20 years. Exceptions to this are the recent work done on invertebrates, e.g. green snail, and sea cucumbers (the status of the latter is described in Box 4). In general, those fish and invertebrate species that are sought after and are located in areas readily accessible to many fishers tend to be heavily exploited or overexploited.

Box 4: Status of Vanuatu's sea cucumber resource
The big question is: Are the sea cucumber stocks ready for harvest? The answer for now would be no; the resources remain depleted. None of the stocks are present in sufficient abundance and individuals are too small to support an economically viable fishery. Densities for the fast-growing lollyfish at two sites were poor in contrast to healthy densities of 5 600 individuals per hectare and 2 400 individuals per hectare in reef transect and manta tow surveys, respectively. The fishery has been fished continuously in the last 25 years; some slower-growing species, such as black teatfish (*H. whitmaei*), can take up to 10 years to recover; 5 years is barely enough time to see significant change. The 5 years of closure does not provide sufficient time to allow strong population recovery for all sea cucumber species. The populations of sea cucumbers at the two sites in Vanuatu consist entirely of smaller animals, which are either sexually immature or just entering maturity and so have weaker spawning capacity (the majority of sizes recorded were below the common sizes recorded in the other areas of the Pacific). These small sea cucumbers would make low quality products in terms of size (length and width) and meat content (lower weight) and so are worth much less at the market than fully grown sea cucumbers. A sea cucumber consignment that was confiscated is proof of this; the majority of sea cucumbers that were illegally harvested and about to be smuggled out of the country were all under existing size limit regulations.
Pakoa *et al*. (2013a)

(9) Also called Tectus niloticus.

Management applied to main fisheries

Sections 10 and 11 of the Fisheries Act 2014 state that the Minister responsible for fisheries may determine that a fishery is a designated fishery if it (a) is important to the national interest; and (b) requires management and development measures for its effective conservation and optimum utilization. The Director of Fisheries is required to prepare a plan for the management and development of each designated fishery. Each plan must:

- identify each fishery and its characteristics, including the present state of its exploitation; and

- identify each fishery and its characteristics, including the present state of its exploitation; and
- specify the objectives to be achieved in the management of the fishery to which it relates; and
- specify the management and development strategies to be adopted for the fishery to which it relates; and
- provide for a scheme of licensing, if necessary, or other appropriate management measure; and
- specify, if applicable, the licensing regime to be applied, including the limitations, if any, to be applied to local fishing operations and the amount of fishing, if any, to be allocated to foreign fishing vessels; and
- specify the information and other data required to be provided by persons licensed to fish for that fishery; and
- take into account any relevant traditional fishing methods and practices including traditional management systems and strategies.

Tuna fisheries in Vanuatu are managed on regional and national levels.

- On the regional level, Vanuatu is a member of the Western and Central Pacific Fisheries Commission (WCPFC) that was established by the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Vanuatu and the other 26 members of the commission enact tuna management measures at the annual WCPFC meeting. From the Vanuatu perspective, the two most important recent measures are: (1) the Conservation and Management Measure for South Pacific Albacore, and (2) the Conservation and Management Measure for Bigeye, Yellowfin and Skipjack Tuna in the Western and Central Pacific Ocean.
- On the national level, the tuna fisheries are managed by the Tuna Fishery Management Plan (VFD and FFA, 2014). Key features of that plan are: restrictions on the total number of licenses, closed areas to fishing, and a total allowable catch for each of the four major species of tuna.

Management plans have been prepared for several coastal fisheries. These include deep-bottom fish, aquarium fish, coconut crab and sea cucumber. As an example, a summary of a Vanuatu management plan is given in Box 5.

Box 5: Deep-Bottom Fish Fishery Management Plan
The Ministry has designated the deep-bottom fish fishery to be important for the national interest and the Director of the Vanuatu Fisheries Department has prepared the Vanuatu National Deep-Bottom Fish Fishery Management Plan. The Plan sets out the formal policy guidelines in the form of strategies and measures for the sustainable development, management, and conservation of the deep-bottom fish fishery. The Plan comprises 10 sections, and includes an introduction, fishery overview, legal and policy framework, issues and challenges faced by the fishery, current and previous management measures applied to the fishery, broad policy directions needed for the fishery, management measures and strategies, policy priority areas, monitoring and evaluation methods, and review and amendment procedures. A key element in the development process of the Plan is consultation. The Plan is a result of a nationwide consultation process that started in 2013. Consultations were conducted on various levels, including national and provincial government, communities and fishers. The Plan has been structured in accordance with the requirement of the Fisheries Act but reflects the views received during the consultation process.
Source: VFD (2016)

The management of the sea cucumber fishery is a special case. In 2008, the fishery was closed for a five-year period, 2008–2013. Upon the completion of that ban, it was extended to 2018, although it was opened between 1 September and 31 December 2015 to compensate for the large negative economic impacts of Cyclone Pam.

The management authority for subsistence fisheries is primarily vested with the traditional reef custodians through customary marine tenure (CMT). CMT is legally recognized in Vanuatu in Chapter 12 of the Constitution, which states:

- All land in the Republic of Vanuatu belongs to the indigenous custom owners and their descendants;
- "Land" is further defined in the Land Reform Act to include "… land under water including land extending to the sea side of any offshore reef but no further";
- The rules of custom shall form the basis of ownership and use of land in the Republic of Vanuatu.

These articles provide for the customary owners' rights to manage their land and reefs as they have traditionally done for centuries through the use of taboos and other restrictions on fisher behaviour. Research into traditional resource management in Vanuatu reveals a strong heritage of managing resources through CMT and a combination of traditional beliefs and practices that included privileged user's rights, species-specific prohibitions, seasonal closures, food avoidance and closed areas. Examples of these practices include the placement of marine closures or taboos for seven years or more upon the death of a chief or any clan member or on the ordination of a traditional leader; seasonal prohibitions on consuming certain fisheries resources following agricultural cycles; respect and avoidance of areas of symbolic significance; and behavioural restrictions for fishers that limit fishing effort, including those associated with totemic restrictions. The Vanuatu Department of Fisheries actively supports these customary practices and recognizes CMT as a viable, decentralized system of resource management that fosters a sense of responsibility amongst communities for managing their own resources well (Hickey and Jimmy, 2008).

Management objectives

The Tuna Fishery Management Plan (VFD and FFA, 2014) has been developed to meet four key objectives:

1. To ensure that the exploitation of the tuna resources that are found in and pass

through Vanuatu waters is compatible with the sustainability of the stocks throughout their range.

2. Within the limits of the sustainability objective, to ensure the harvest is taken in a way that maximizes the long-term economic and social benefits received by the people of Vanuatu.

3. To contribute to the food security of ni-Vanuatu.

4. To meet regional and international responsibilities for tuna management.

In Vanuatu's coastal fisheries, the objectives of fisheries management vary considerably between the various fisheries. Most plans include notions of sustainability and economic benefits for the country. As an example, the Deep-Bottom Fish Fishery Management Plan states that the objectives are to ensure:

- that exploitation takes advantage of potential productivity of fish stocks while ensuring that the conservation of the stocks remains above agreed harvest limit reference points;
- the optimal use of deep-bottom fish resources for long-term sustainable food security, livelihoods and economic development within communities of Vanuatu;
- that an effective monitoring programme is established;
- the promotion and support of co-management principles and community participation in managing the fishery; and
- that the deep-bottom fish fishery contributes to economic development within the urban, suburban and rural areas of Vanuatu.

The management of subsistence fisheries is mostly by traditional reef custodians through customary marine tenure. The management objectives vary considerably from area to area, but many include the goal of assuring the continued flow of fishery foods to coastal communities.

Management measures and institutional arrangements

In Vanuatu, the main institution involved with fishery management is the Department of Fisheries. The role of this agency is covered in more detail in section 8 below.

Fishing communities

The concept of "fishing communities" has limited applicability to Vanuatu. Nearly all households in coastal villages are involved in coastal fishing activities. It could therefore be stated that all coastal villages in Vanuatu are "fishing communities".

Inland sub-sector

Extensive information on the country's freshwater fish and invertebrate resources is provided in profiles of Vanuatu's fishery resource (Amos, 2007). It is reported that the distribution of the various freshwater ecosystems is patchy throughout the Vanuatu archipelago, covering only 1.0 percent of the total land area. Freshwater ecosystems on Vanuatu's larger islands (e.g. the Jordan River on Santo, Cooks River on Erromango Island and Pankumo River on Malekula Island) have discharges, which form cascades, rockfaces, pools and tidal reaches, and are often characterized as having extensive flood plains. Smaller islands' ecosystems, on the other hand, have only streams, which are often ephemeral. The profiles cover 18 families of local freshwater fish, 3 families of introduced fish, and several species of shrimps and crabs. According to the profiles, the most important taxa for fishery purposes are: (a) local species of fish – five genera of fish (*Khulia, Lutjanus, Gerres, Monodactylus, Scatophagus*), four species of mullets, and several species of freshwater eels; (b) introduced species of fish – *Cyprinus* and two species of tilapia; and (c) invertebrates – several species of *Macrobrachium*.

An individual with a long historical involvement in Vanuatu fisheries examined the available freshwater fisheries data, discussed the issue of freshwater fishing with other local fisheries specialists, and estimated that recent annual production from freshwater fisheries in the country is about 88 tonnes per year (F. Hickey, personal communication).

The freshwater catch is almost entirely for subsistence use, except for the *Macrobrachium* shrimp, which is sold in urban areas.

Any management of the freshwater fisheries is carried out through customary marine tenure (see above).

Aquaculture sub-sector

In estimates of Vanuatu's aquaculture production for 2014, FAO data shows production of 80 tonnes. The SPC study (Gillett, 2016) gives production for 2014 of 43 tonnes and 27 300 pieces (giant clam, trochus and green snail), with a farm-gate value of USD 383 377.

The SPC study used information on aquaculture obtained in discussions with the staff of the Fisheries Department, commercial producers and SPC personnel to estimate the 2014 production and value of seven commodities (Table 7).

Table 7: Aquaculture production in Vanuatu in 2014

Commodity	Type production	Current estimated annual production	Annual production value (VUV)	Annual production value (USD)	Comment
Tilapia	Commercial farm	30 tonne	16 500 000	160 960	One commercial farmer; some barramundi produced (VUV 1 200 per kg); farm wiped out by Cyclone Pam in early 2015.
Tilapia	Village ponds	1 tonne	400 000	3 902	About 50 village farms; 70% of production is on Santo.
Prawns	Commercial farm	13 tonne	22 100 000	215 589	One commercial farmer; *P. vanamei* is produced; most is for domestic market; exports piggyback on beef exports.
Macrobrachium	Village ponds	120 kg	180 000	1 756	3 village ponds; started production in late 2014.
Coral culture	One company	-----	-----		No production since destruction caused by cyclone in 2008.
Giant clam	Government operation	300 pieces	120 000	1 171	Most given to communities at about 3 cm in size; lost all standing production in Cyclone Pam
Trochus	Government operation	25 000 pieces	----	160 960	For restocking purposes; lost all standing production in Cyclone Pam
Green snail	Government operation	2 000 pieces	----	3 902	For restocking purposes; lost all standing production in Cyclone Pam

Source: S. Rena, G. Norton, and R. Jimmy (personal communication, August 2015)

The management of aquaculture in Vanuatu is primarily through provisions in legislation. Vanuatu's Aquaculture Development Plan 2008–2013 indicates that, although there is no provision for aquaculture management in the Fisheries Act, the Minister has power to make regulations. Relevant non-fisheries legislation includes:

- the Environment Act of 2002, which subjects aquaculture development to bio-prospecting regulations, especially for environmental impact assessments, and close monitoring for environmental, social and customary impacts;
- the Animal Importation and Quarantine Act No. 7 of 1997, for animal imports;
- the Animal Disease Control Act No. 29 of 1991, which gives the Quarantine Service the power to intervene in cases of fish disease.

Recreational sub-sector

Sport fishing, or game fishing, is an important component of the Vanuatu fisheries sector. There are currently 20 to 30 game-fishing boats based in the country. Many of these vessels also carry out commercial fishing activities and sell their catch on the local market. Sport-fishing charter boats are now categorized as fishing vessels under the revised Vanuatu Fishing Act of 2004, meaning it is a licensed fishing activity. Some FADs have been deployed on Efate and Santo to attract coastal tuna activities. The main beneficiaries of these FADs are the game-fishing boats (Friedman *et al*., 2008).

The management of sport fishing is covered by the Vanuatu Tuna Management Plan. Relevant provisions of the plan include the following:

- Charter sport fishing vessels that sell their catch are considered to be commercial fishing vessels. They will be required to obtain a commercial fishing licence and must follow the same rules for determining fees and licensing conditions as any other commercial vessel.
- Only local fishing vessels are eligible to fish around FADs. There will be no specific closed area around them for local fishing vessels less than 10 m and sport-fishing/ game-fishing vessels.
- Sport-fishing/game-fishing vessels must comply with provincial by-laws.
- The maximum number of locally based foreign and local fishing licences for sport fishing/game fishing is 55.
- The licence fees to be paid depend on the size of the sport-fishing/game-fishing vessel and the location of the base.

Post-harvest sector

Fish utilization

In general offshore fishing is export oriented. The high-quality fresh bigeye and yellowfin are typically exported to Japan and the USA. Much of the albacore is sent to canneries in American Samoa, with some going to canneries in Southeast Asia.

In the coastal fisheries:

- Inshore finfish and invertebrates are largely consumed by the harvesting household, but a significant amount is sold to urban residents and resorts/restaurants. Those commercial establishments pay especially high prices for deep-water demersal fish, lobsters and coconut crab.
- The beche-de-mer is shipped to China.
- The aquarium fish and associated coral products are shipped to the USA.
- The trochus is either processed locally to form button blanks or for export to Asia and Europe to form high-quality mother-of-pearl buttons.

Fish markets

Two government-owned urban fish markets with substantial refrigerated fish storage were established in 1983: the Port Vila market, called Port Vila Fisheries Limited (commonly known as Natai) located on the waterfront, and the Luganville Santo Fish Market located adjacent to the public market on the Sarakata River. The role of the fish markets was to sell high-value deep-water fish from rural fisheries centres in the two urban centres, where there was growing demand from the tourism sector and urban markets. Airfreight was relied on for shipment of fish to these urban centres. In the mid-1990s both markets closed. The reasons for the closures are related to government involvement in commercial activities and subsequent divestment (Hickey and Jimmy, 2008)

Currently, there are a few commercial fish markets in the main urban areas of Port Vila and Luganville, plus several locations where fish are informally marketed.

Socio-economic contribution of the fishery sector

A recent study by SPC (Gillett, 2016) attempted to quantify the fishery-related benefits received by Vanuatu and other Pacific Island countries. The study gave the available information on the contribution of fishing to GDP, exports, government revenue, employment and nutrition. Unless otherwise noted, the information in this section is from that study.

Role of fisheries in the national economy

The Vanuatu National Statistics Office makes the official estimate of the fishing contribution to the GDP of Vanuatu. The SPC study examined the official methodology and, using its independent estimate of the value of fisheries production, re-estimated the fishing contribution:

- The official contribution showed a 2014 fishing contribution to GDP of USD 4.7 million, or 0.64 percent of GDP.
- The contribution of fishing to GDP was re-estimated by the SPC study for the year 2014. It showed a contribution of USD 11.3 million, or 1.5 percent of GDP.

In 2014 Vanuatu received USD 1.8 million in access fees for foreign fishing. Access fees represented about 1.0 percent of government revenue for that year.

Trade

The Merchandise Trade Statistics (VNSO, 2015) give the principal exports of Vanuatu. The details relevant to fisheries are extracted and given in Table 8.

Table 8: Fishery exports of Vanuatu

	2013 (VUV millions)	2013 (USD millions)	2014 (VUV millions)	2014 (USD millions)
Shell	30	0.3	44	0.4
Live fish	88	0.9	142	1.4
Fish	139	1.4	10	0.1
Total fishery exports	257	2.7	196	1.9
Total exports	3 651	38.0	6 100	59.5
Fisheries exports as a % of total exports	7.0%	7.0%	3.2%	3.2%

Source: VNSO (2015)

FAO data for the export of fishery products from Vanuatu was USD 67.1 million in 2013 and and USD 77.7 million in 2014 (Part 1 of this profile). The difference between FAO data and that reported by the Vanuatu National Statistics Office is likely to be that the Vanuatu government does not consider the catches of Vanuatu-flagged vessels that are made outside Vanuatu waters (i.e. the catch of flag of convenience vessels) and never brought to Vanuatu as exports of the country.

For 2014, FAO data shows USD 5.5 million of fishery imports (Part 1 of this profile).

Food security

In older studies of fishery resource consumption in Vanuatu:

- Preston (1996) estimated annual per capita fish supply from coastal fisheries in Vanuatu as 15.9 kg;
- Preston (2000), using 1995 FAO data and considering production, imports and exports, estimated the annual per capita supply as 21.0 kg;
- Gillett and Lightfoot (2001) considered Vanuatu fishery production, imports, exports and population to estimate that annual per capita consumption of fishery products in 2000 was about 25.7 kg.

Bell *et al*. (2009) used information from household income and expenditure surveys (HIES) conducted between 2001 and 2006 to estimate patterns of fish consumption in Pacific Island countries. The HIES were designed to enumerate consumption based on both subsistence and cash acquisitions. For the whole of Vanuatu, the annual per capita fish consumption (whole weight equivalent) was 20.3 kg, of which 60 percent was fresh fish. For rural areas, the per capita consumption of fish was 20.6 kg, and for urban areas, 19.3 kg.

Factors influencing the future demand for fish are increases in the price of fish (over-exploitation of inshore areas, gradual devaluation of the local currency), growth of the tourism industry, the relative cost of fish substitutes, and changes in dietary preferences.

Employment

The Vanuatu Socio-Economic Atlas (World Bank, 2014) uses information from both the 2009 census and the 2010 household income and expenditure survey (VNSO, 2013). It shows:

- the percentage of households that are involved in any fishing activity: Torba (76.8 percent), Sanma (48.7 percent), Penama (36.1 percent), Malampa (46.1 percent), Shefa (43.3 percent), Tafea (43.1 percent), Port Vila (9.6 percent) and Luganville (17.6 percent);
- the percentage of households that report sale of fish/crops/handicrafts as a main source of income: Torba (61.2 percent), Sanma (67.3 percent), Penama (67.9 percent), Malampa (60.0 percent), Shefa (46.1 percent), Tafea (60.2 percent) Port Vila (2.2 percent) and Luganville (4.4 percent);
- areas with especially high involvement in fishing: Northwest Santo, South Maewo, South Malekula, North Erromango, South Erromango and Aneityum.

The Vanuatu 2010 HIES found that more than 75 percent of the adult population practise at least one form of fishing, whether subsistence or commercial. The survey showed that 2 percent of urban households and 12 percent of rural households had income from the sale of fishery products. The HIES estimates the total income from the sale of fish and seafood was VUV 36 million annually[10], an average of VUV 7 100 per household per month. The provinces of Tafea, Shefa (rural) and Torba had the highest proportion of income from the sale of fish and seafood, representing almost two-thirds (64 percent) of total income from the sale of fish and seafood. Finfish sales amounted to just over VUV 20 million, and all other seafood combined to about another VUV 15 million.

An article on coastal fisheries and human development in Vanuatu (Hickey, 2008) described the participation of women in Vanuatu fisheries:

Most rural-based women fishers use their catches primarily to ensure household food security. Since no cash is involved, these fisheries are viewed by policy-makers and donors as less important than commercial fisheries**.** However, women are becoming increasingly involved in commercial fisheries, including for trochus, as well as in adding value to their catches. Many women with access to markets in Vanuatu collect fish, octopus and shellfish, including giant clams, for preparation with traditional puddings covered in coconut cream to produce a value-added product for sale in municipal markets or other popular outlets, such as kava bars. Alternatively, some women in the urban areas simply purchase reef fish from urban outlets for preparation in puddings for sale at various outlets, thereby adding value to these catches.

(10) In 2010, USD 1.00 = VUV 95.24.

Rural development

The Fisheries Department's Development & Capture Division promotes artisanal, commercial and subsistence fishing enterprises to improve the livelihood of rural areas. The department maintains extension centres in all six provinces. One of the major objectives of these outposts is to promote fisheries development through a variety of ways, including market facilitation, advice on fisheries management, deployment of offshore fish aggregation devices (FADs) and provision of ice-making equipment.

Trends, issues and development

Constraints and opportunities

Major constraints for fisheries development include the following:

- Many of the inshore fishery resources, especially those close to the urban markets, are fully or over-exploited.
- Small-scale fishers have difficulty in economically accessing the relatively abundant offshore fishery resources.
- There are considerable difficulties associated with marketing fishery products from the remote areas where abundance is highest to the urban areas where the marketing opportunities are greatest.
- Port Vila is a relatively high-cost location to base an industrial fishing fleet.
- The workforce is inadequately trained.

Opportunities in the fisheries sector include:

- taking advantage of the proximity of Port Vila to good longline fishing grounds;
- establishing closer linkages between the fishing and tourism sectors;
- encouraging more on-shore processing of fish caught by vessels fishing in Vanuatu waters;
- the availability of high-quality technical assistance from SPC and FFA.

Government and non-government sector policies and development strategies

In December 2016, the Vanuatu National Fisheries Sector Policy 2016–2031 (MALFFB, 2016) was signed by the Minister of Agriculture, Livestock, Forestry, Fisheries and Biosecurity. The 39-page document includes a vision, mission, guiding principles, strategic policy objectives, and the details of strategic action in eight areas.

The document states that the policy focuses on improving fisheries governance, sustainable and economically viable fisheries and aquaculture, improved access to finance, improved infrastructure, market access, seafood safety and value-adding, sustainable growth, employment, food security and livelihoods.

The plan gives the following development strategies for coastal fisheries:

- Deployment of FADs in all provinces
- Train fishers in fishing skills and FAD management
- Establish fisher associations
- Provide fishing gear and boat support to associations on credit
- Establish fish preservation support in strategic market locations across the country
- License all fishing boat operators
- Provide duty concessions to all boat operators
- Maintain support and engagement with fisher associations.

Related to the Fisheries Policy is the mission statement of the Fisheries Department:

"The mission of the Fisheries Department of Vanuatu is to ensure sustainable management, development and conservation of fish resources in order to achieve maximum social and economic benefits to Vanuatu for the present and future generations."

At their March 2012 summit, the leaders of the Melanesian Spearhead Group (MSG) of countries (Fiji, New Caledonia, Papua New Guinea, Solomon Islands and Vanuatu) agreed to develop a roadmap for the protection of inshore fisheries (Box 6). That roadmap gives some insight into Vanuatu's future policies and strategies in inshore fisheries management.

Box 6: MSG Roadmap for inshore fisheries
The "Melanesian Spearhead Group Roadmap for Inshore Fisheries Management and Sustainable Development 2015–2024" is a management framework and subregional roadmap for sustainable inshore fisheries, developed by the MSG Secretariat in cooperation with representatives of the fisheries departments of the MSG countries and with the technical assistance of the Secretariat of the Pacific Community (SPC). The regional roadmap provides overarching guidance for MSG members and enumerates the actions they have agreed to take to address the management of inshore fisheries in Melanesia.

The vision of the roadmap is "sustainable inshore fisheries, well managed using community-based approaches that provide long-term economic, social, ecological and food security benefits to our communities".

The objectives of the roadmap are: 1. Development of an effective policy, legislation and management framework for the management of inshore resources, in accordance with other relevant international agreements, to empower coastal communities to manage their marine resources. 2. Education, awareness raising and the provision of information on the importance and management of inshore fisheries. 3. Capacity building to sustainably develop and manage inshore resources with particular reference to experiences in the MSG members. 4. Adequate resources to support inshore fisheries management and best available science and research. 5. Secure long-term economic and social benefits to coastal communities from the sustainable use of inshore resources. 6. Establishment of effective collaboration with stakeholders and partners. 7. Restoration and maintenance of beche-de-mer stocks to maximize long-term economic value to coastal communities.

The roadmap was adopted by the leaders of Fiji, New Caledonia, Papua New Guinea, Solomon Islands and Vanuatu in June 2015.

Research, education and training

Historical fisheries research in Vanuatu is given in the Vanuatu Fisheries Bibliography (Gillett and Kenneth, 1987). More recent research specific to particular fisheries appears in the profiles of Vanuatu's fishery resources by Bell and Amos (1993) and Amos (2007).

Friedman *et al*. (2008) summarized some of the most significant marine research in Vanuatu:

Past research activities in Vanuatu rely on assistance from outside institutions to conduct marine research as there are no such institutions in the country. The 10-year Village Fisheries Development Project conducted a comprehensive study on the deep-water bottomfish resources of Vanuatu. The most comprehensive study on Vanuatu reef resources was carried out in 1988 and 1989 by the Australian Institute of Marine Science. A joint collection of reef fish in 1996 and 1997 by the Australian Museum, Smithsonian Institute and Vanuatu Fisheries recorded many reef fish found down to 30 m. Several studies on traditional marine tenure and community-based management have been conducted in Vanuatu. They include studies on the performance of traditional marine tenure systems in community fisheries management, the evolution of village-based marine resource management in Vanuatu from 1990 to 2001, the government-supported, village-based management of marine resources in Vanuatu, and reef and lagoon tenure in the Republic of Vanuatu and its prospects for mariculture development. Stock assessments of giant clam, bêche-de-mer and rock lobster have been executed by Vanuatu Fisheries Department in collaboration with New Zealand's Bay of Plenty

Polytechnic and funded by FFA. Coral reef monitoring activities were initiated in 2000 with funds provided by the Canada South Pacific Ocean Development Programme and FFA. Assessment of the stock of aquarium fish provided baseline data on the aquarium fish resources of Efate. Mariculture of *Trochus niloticus*[11] and green snail was initiated in 1990 with the support of FAO. Successful production of trochus juveniles led to a trochus reseeding research project commissioned from 1995 to 2000 and funded by the Australian Centre for International Agricultural Research (ACIAR). The aim of this study was to test the viability of stock restoration with cultured shells. Seaweed trials were conducted in various areas in the country in 1999 and 2000, funded by FFA. Present research and development of aquaculture is currently generating a lot of interest from foreign investors and local communities. Trials on genetically improved, farmed tilapia (*Oreochromis niloticus*) initiated by the Fisheries Department in 2000 have been successful and the fish has been widely accepted. The trials were funded by FFA with advice provided by SPC's Aquaculture Section and have sparked local interest in freshwater farming.

(11) Or *Tectus niloticus*.

Education and training

As part of earlier European Union-funded fisheries development efforts, a Fisheries Training Centre was established in Luganville, Espiritu Santo, in 1991. Island fishers could reside at the centre for a month while they received training in deep-water and pelagic fishing gear and methods, fish handling, outboard engine and boat maintenance, and basic financial management. Hundreds of fishers from throughout the group received training through the centre during the 1990s. However, with the cessation of EU funding in 1996, the government had difficulty in funding the centre and it was decided to eventually allocate it to the newly formed Vanuatu Maritime College (VMC) in 2001. The college trains seafarers for employment on merchant and fishing vessels as well as on cruise ships. VMC includes in its mandate practical fisheries training for rural communities in addition to its primary function of providing training to seafarers. Fisheries training courses are run in rural areas following requests from provincial governments, fishers' associations and/or from the Department of Fisheries (Hickey and Jimmy, 2008).

Higher-level or academic training in fishery-related subjects is generally sought overseas and is undertaken in a variety of institutions:

- Academic training in biological, economic and other aspects of fisheries is given at the University of the South Pacific in Suva, and to a lesser extent at universities in New Zealand, Australia, Japan and the United Kingdom.
- Training courses, workshops and attachments are frequently organized by the regional organizations: SPC in New Caledonia and FFA in the Solomon Islands. The subject matter has included such diverse topics as fish-quality grading, stock assessment, seaweed culture, fisheries surveillance and on-vessel observing.

Foreign aid

Vanuatu has enjoyed fisheries sector assistance from a range of multilateral and bilateral donors. Support has historically included the funding of expatriate staff positions within the Department of Fisheries, establishment and operation of rural fishing centres, provision of vessels, FAD materials and equipment, construction of aquaculture facilities, collaborative research costs, and travel costs for training and attendance at meetings.

Important donors have included the governments of Britain, Australia, New Zealand and Japan, as well as the European Union. Other donors have included ACIAR, the International Centre for Ocean Development and the Canadian International Development Agency. Assistance is also obtained from the international organizations of which Vanuatu is a member, including ADB, and FAO, UNDP, ESCAP and other United Nations agencies. The regional organizations serving Pacific Island countries, including FFA and SPC have been active in supporting Vanuatu's fisheries sector.

Institutional framework

The Vanuatu Fisheries Department (VFD) is the government body charged with the implementation and enforcement of fisheries management laws, policies, regulations and principles. It is part of the Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity (MALFFB). The VFD has six divisions: Administration, Management & Policies, Development & Capture, Research & Aquaculture, Seafood Verification, and Licencing & Compliance. The latest annual report of the Fisheries Department (VFD, 2013) indicates that, as of 2012, there were 57 positions in the department. Other government agencies in Vanuatu have some involvement in fisheries. Pascal *et al*. (2015) summarizes the fisheries-related involvement of those agencies: **Prime Minister's Office** — The Office is responsible for the national development plan which sets the tone for and priority of natural resource management, including marine resource management. The office also gathers data on major sectors (i.e. agriculture) but not subsistence values. **Department of Environment Protection and Conservation** — Environmental impact assessment is used in Vanuatu to put monetary values on damage to ecosystems, but not to put a value on healthy ecosystems. The department has studied wetland ecosystem services and made lists of the services they provide and has also done limited biodiversity assessments in protected areas. **Department of Forestry** — The department's jurisdiction includes mangroves. The department has conducted some carbon accounting exercises, putting financial values on ecosystems (including mangroves), but on a very small scale. **Department of Tourism** — Tourism in Vanuatu is an important source of revenue and is largely reliant on marine resources. The department conducts strategic planning for tourism development and, to inform this effort, produces quarterly reports and data on incoming and outbound tourists and the main purpose of visits, etc. The importance of the ecosystems on which much of the tourism value is based is not assessed. **Vanuatu National Statistics Office (VNSO)** — Social statistics gathered by VNSO include data on education, health and the labour force. Fishing activities are also measured. For example, there is quarterly information on commercial catches and information on fishing tax and fishing licences, but no information on subsistence catches. **Public Works Department** — The department is responsible for public works, which can often have impacts on the marine environment. Small collections of natural resources are quantified but not entire ecosystems. Although Vanuatu is governed by a parliamentary democracy, village chiefs have an important role in decision-making at the village level, including decisions about the management of marine and coastal resources. Other institutions in the country that are relevant to fisheries are the Vanuatu Maritime College, the Sports/Charter Boat Association, the Vanuatu Fishermen's Association, fishers' cooperative associations, and the Vanuatu Chamber of Commerce and Industry. Important internet links related to national fisheries and aquaculture include:

- Vanuatu Fisheries Department: www.fisheries.gov.vu
- Vanuatu Maritime College: www.santovanuatu.com/place/vanuatu-maritime-college/
- Forum Fisheries Agency (FFA): www.ffa.int
- Pacific Community (SPC): www.spc.int
- Western & Central Pacific Fisheries Commission (WCPFC): www.wcpfc.int

The major regional institutions involved with fisheries are the Forum Fisheries Agency (FFA), located in Honiara and the Pacific Community (SPC) in Noumea. Other players are the Parties to the Nauru Agreement (PNA) Office in Majuro, the Pacific Islands Forum Secretariat (PIFS) in Suva, the Secretariat of the Pacific Regional Environment Programme (SPREP) in Apia, and the University of the South Pacific (USP) in Suva. The various characteristics of those institutions are given in Table 9.

	FFA	SPC	Other regional organizations with fishery involvement
Main area of emphasis	Providing management advice on tuna fisheries and increasing benefits to Pacific Island countries from tuna fishing activities.	Most aspects of coastal fisheries and scientific research on tuna. Fisheries are only one aspect of SPC's work programme, which also covers such issues as health, demography, and agriculture.	PNA – subregional grouping of countries where most of the purse seining occurs; SPREP – environmental aspects of fisheries; USP – School of Marine Studies (SMS) is involved in a wide range of training; PIFS – major political initiatives, some natural resource economics; leads trade negotiations with the EU, which have a major fisheries component.
Inter-regional relationships	The FFA/SPC relationship has had ups/downs over the years. It has been most difficult in early 1990s, but tremendous improvement in mid/late 1990s. An annual colloquium has helped the relationship. Staff who have moved between the two organizations have made a noticeable improvement in understanding. Much of the success/benefits achieved by FFA/SPC cooperation depends on the personalities of FFA's Director/Deputy and SPC's Director of the Division of Fisheries, Aquaculture and Marine Ecosystems.		At least in theory, all regional organizations come under the umbrella of PIFS. Their activities are coordinated to some degree by the Council of Regional Organisations in the Pacific (CROP), which has a Marine Sector Working Group that meets at least once per year, but is limited by lack of resources for follow-up. FFA originally provided secretariat services to the PNA, but the PNA broke away from FFA in 2010. Currently, there are some sensitivities in the relationship – but it appears to be improving.
Main strengths	Direct contact with its governing body many times per year results in a high degree of accountability. Mandate of tight focus on tuna eliminates considerable dissipation of effort.	Noumea being a pleasant place to work, there is considerable staff continuity. The Oceanic Fisheries Programme often sets the standard for tuna research in the world. Documentation of work is very good.	Because PIFS is under the national leaders, it is considered the premier regional organization. PNA has achieved considerable success and credibility in such areas as raising access fees, 100 percent observer coverage, eco-certification, high seas closures, and controls on FADs. USP is centrally located in the region and the SMS has substantial infrastructure. SPREP has close ties to NGOs active in the marine sector.
Membership	Australia and New Zealand, plus Cook Is., FSM, Fiji Kiribati, Marshall Is., Nauru, New Zealand, Niue, Palau, PNG, Samoa, Solomon Is., Tokelau, Tonga, Tuvalu and Vanuatu	Includes the major metropolitan countries, all Pacific Island countries, and the French/UK/US territories; the most inclusive of any regional organization.	PNA: FSM, Kiribati, Marshall Is., Nauru, Palau, PNG, Solomon Is. and Tuvalu. USP: Cook Is., Fiji, Kiribati, Marshall Is., Nauru, Niue, Samoa, Solomon Is., Tokelau, Tonga, Tuvalu and Vanuatu. SPREP: 21 Pacific Island countries and territories, plus Australia, France, New Zealand and USA. PIFS: same as FFA.

Source: Adapted from Gillett (2014) The Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean entered into force in June 2004, and established the Western and Central Pacific Fisheries Commission (WCPFC). Vanuatu is a member of the commission, along with 26 other countries. WCPFC has its headquarters in Pohnpei, Federated States of Micronesia, and has held 13 annual meetings to date.

Legal framework

The Fisheries Act No. 10 of 2014 states that it is a law to repeal the Fisheries Act (CAP 315) and to make provision for the management, development and regulation of fisheries within Vanuatu waters, and for the control of fishing vessels entitled to fly the flag of Vanuatu outside of Vanuatu waters in a manner consistent with Vanuatu's international obligations, and for related matters.

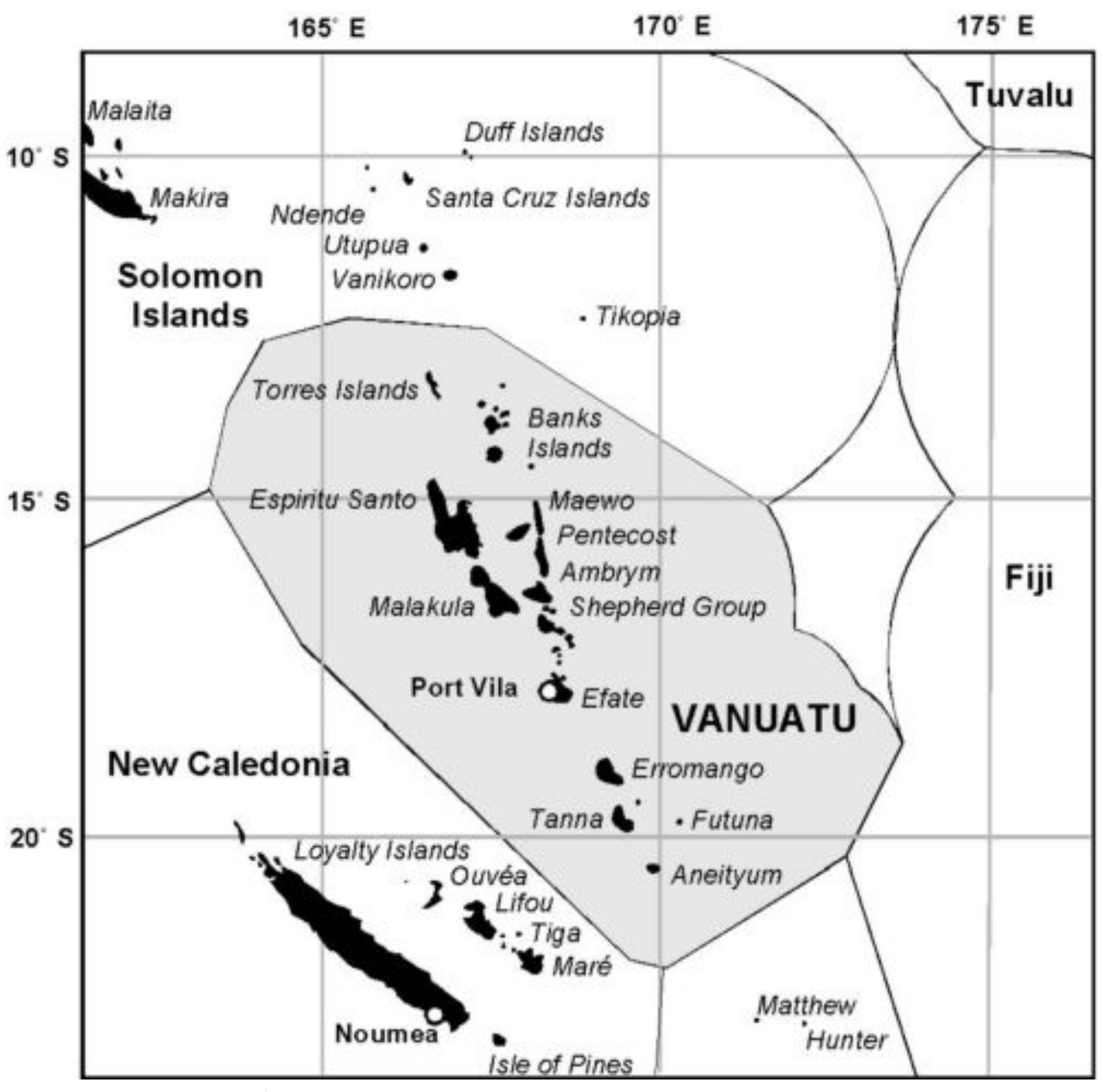
The Act is a 135-page document containing 23 parts:

1. Preliminary matters
2. Purpose and principles
3. Administration
4. Fisheries management, development and conservation
5. Aquaculture management and development
6. Seafood verification agency
7. Vanuatu fishing vessels and local fishing vessels in Vanuatu waters
8. Registration of fishing vessels on the international shipping registry
9. Requirements for charter of fishing vessels
10. Foreign fishing vessels
11. Compliance with international obligations
12. Fishing by Vanuatu vessels beyond Vanuatu waters
13. General licensing provisions
14. Ban on driftnet fishing
15. Vanuatu marine mammals sanctuary
16. Other prohibited activities
17. Other approvals
18. Authorized officers, observers and port samplers
19. Monitoring, control and surveillance
20. Sale, release and forfeiture of seized property
21. Jurisdiction and evidence
22. Regulations and penalty notices
23. Miscellaneous

The notable provisions of the Act are as follows:

- The Fisheries Management Advisory Council is established. The function of the Council is to provide recommendations to the Director on policy matters relating to fisheries conservation and management.
- The Minister may determine that a fishery is a designated fishery if, having regard to scientific, economic, environmental and other relevant considerations, the Minister considers that the fishery is important to the national interest, and requires management and development measures for its effective conservation and optimum utilization. The Director of Fisheries is to prepare, and review where necessary, a plan for the management and development of each designated fishery.
- A person must not carry out aquaculture unless the person complies with the applicable laws, pays the prescribed licence fee, and is granted an aquaculture licence granted by the Director of Fisheries.
- The Vanuatu Seafood Verification Agency is established. The Agency has the following objectives: (a) to verify and certify the import and export of seafood; and (b) to ensure the application of appropriate quality control measures and seafood production industry standards; and (c) to ensure the facilitation of exports from Vanuatu of all categories of seafood for human consumption.
- A person must not use a fishing vessel for commercial fishing or related activities in Vanuatu waters unless he or she has been issued with a local or foreign fishing licence.
- Requirements are given for registration of fishing vessels on the Vanuatu International Shipping Registry.

Annexes



Map courtesy of SPC

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Additional information

FAO Thematic data bases

Database on Introductions of Aquatic Species
FAO Country Profile
FAOLEX legislative database
SSF-LEX

Publications

List of relevant FAO publications

Meetings & News archive

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